ABSTRACT OF THE DISCLOSURE

A gas sensor includes a semiconductor substrate on which is disposed at least one field electrode, and advantageously a plurality of field electrodes. The field electrodes are disposed under a gas-sensitive semiconductor resistive film, with an insulator layer in between. The film, which may be in electrical contact with a pair of external electrodes, may comprise a metal oxide, such as for example SnO_2, WO_3, In_2O_3, Ga_2O_3, $Cr_{2-x}Ti_xO_{3+z}$, or various organic semiconductors. The field electrodes produce an electric field acting on the semiconductor, and an electroadsorptive effect may occur when the thickness of the gas-sensitive film is on the order of the Debye length. In the case of the known gas-sensitive material SnO_2, for example, the Debye length may be approximately 60 to 80 nm. An electric field produced in the body of the gas sensor may be effective up to the surface of the gas-sensitive film that is exposed to the gas, i.e., the films lying above the gate electrode do not screen the electric field. The use of a plurality of field electrodes may make it possible to offset or control the gradient in the surface potential variation.